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MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER	
HUNG, YUBIN	

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/863,065	KOJIMA ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *7,8,22 and 23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,9-21,24-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 February 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment/Arguments

1. This action is in response to amendment received on July 7, 2004.

2. Claims 7-8 and 22-23 have been canceled. Claims 1-6, 9-21, 24-31 are still pending.

3. The examiner acknowledges and appreciates the applicant clarification on the correct spelling of the applicant's name.

4. In view of applicant's amendment, the objection to the specification has been withdrawn.

5. Applicant's arguments with respect to claims 1-6, 9-21 and 24-30 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections – 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (Pub. No. US 2001/0028737 A1) and Ishikawa et al. (US 5,926,292).

8. Regarding claim 1, and similarly claim 16, Takakura discloses:

- calculating statistic of the small region in color for respective color components
  [Fig. 29, numerals 4-5; P. 10, paragraph 0173, lines 5-9]
- selecting one color component among the color components as a target component according to a comparison between the statistics
  [Fig. 29, numerals 6-7; P. 10, paragraph 0173, lines 10-16. Note that the statistics are the hierarchical relationship derived from the histograms]
- dividing the small region into two sections according to a reference of the target component
  [Fig. 29, numeral 8; P. 10, paragraph 0173, lines 13-14. Note that binarization inherently divide the region into two sections according to a threshold]

Takakura fails to disclose the following:

- extracting a representative color for each section from colors of the section

However, Ishikawa teaches extracting respective representative colors for two sections. (See Fig. 11, numeral 307; Fig. 13, numerals 332-334; Fig. 14; Col. 13, lines 36-42; 55-61; Col. 14, lines 7-32. Note that the specific number of representative colors in this reference is two, one per section.)

Takakura and Ishikawa et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Takakura with the teaching of Ishikawa et al. by extracting respective representative colors for two sections. The motivation would have been to enable compression of the data in a block [Ishikawa et al. Col. 1, lines 63-65].

Therefore, it would have been obvious to combine Ishikawa et al. with Takakura to obtain the invention as specified in Claim 1.

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9. Claims 2 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1) and Ishikawa et al. (US 5,926,292) as applied to claims 1 and 16, further in view of Allebach et al. (US 5,544,284).

10. Regarding claim 2, and similarly claim 17, Takakura et al. and Ishikawa et al. disclose everything except the following:

- setting each section as a small regions if the number of the sections is less than the specific number

However, Allebach teaches/suggests repeatedly partitioning if the desired number of colors is achieved. [See Col. 5, lines 9-12. Note that each cell in the reference corresponds to a region and that repeated partitioning is equivalent to setting the

sections as small regions (because then the "new" small regions can be further divided into sections).]

Allebach et al., Takakura et al. and Ishikawa et al., are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takakura et al. and Ishikawa et al. with the teaching of Allebach et al. by repeatedly partitioning if the desired number of colors is achieved. The motivation would have been to fully utilize the capability of, say, the output device such as a display by using its entire color palette.

Therefore, it would have been obvious to combine Ishikawa et al. and Takakura et al. with Allebach et al. to obtain the invention as specified in Claim 2.

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11. Claims 3 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1) and Ishikawa et al. (US 5,926,292) as applied to claims 1 and 16, further in view of Makita (US 6,269,186).

12. Regarding claim 3, and similarly claim 18, in addition to the limitations of claim 1, Takakura et al. further discloses:

- the statistics are variances for respective color components [Fig. 8, numeral 38; Col. 10, line 5]

Takakura et al. and Ishikawa et al. fail to disclose the following:

- the reference is an average of data of the small region in the target component

However, Makita teaches using the average color value as the threshold. (See Abstract; Fig. 1, numeral 104; and Fig. 2, numeral S202.)

Makita, Takakura et al. and Ishikawa et al. are combinable because they have aspects that are from the same field of endeavor of segmentation.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Takakura et al. and Ishikawa et al. with the teaching of Makita by using the average color value as the threshold (i.e., the reference for dividing the region into two sections). The motivation would have been that the average is the byproduct of computing the variance and therefore requires no additional computing time.

Therefore, it would have been obvious to combine Makita with Takakura et al. and Ishikawa et al. to obtain the invention as specified in Claim 3.

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13. Claims 4 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1) and Ishikawa et al. (US 5,926,292) as applied to claims 1 and 16, further in view of Kobayashi (US 5,608,851).

Regarding claim 4, and similarly claim 19, Takakura et al. and Ishikawa et al. disclose everything except the following:

- the representative color is an average of data of each section

However, Kobayashi teaches using the average of each color data as the representative color. (See Fig. 1, numerals 9, 23; Col. 6, lines 43-47; Col. 7, lines 18-22.)

Kobayashi, Takakura et al. and Ishikawa et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takakura et al. and Ishikawa et al. with the teaching of Kobayashi by using the average of each color data as the representative color. The motivation would have been that the average the representative value that minimizes the sum of squared differences (i.e., in the least-square sense, which is a well-known measure of error) with the original color values of the pixels in the block.

Therefore, it would have been obvious to combine Kobayashi with Takakura et al. and Ishikawa et al. to obtain the invention as specified in Claim 4.

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14. Claims 5 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1) and Ishikawa et al. (US 5,926,292) as applied to claims 1 and 16, further in view of Kimura et al. (US 5,487,119).

Regarding claim 5, and similarly claims and 20, Takakura et al. and Ishikawa et al. disclose everything except the following:

- computing color difference among data included in the small region
- determining the specific number according to the color differences

However, Kimura et al. teaches determining the dynamic range of color values and then applying linear quantization with a fixed quantization step size to determine the number of quantization indexes (i.e., a specific number of representative colors). (See Col. 2, lines 42-61. Note that the dynamic range (line 54) corresponds to the color difference here. Note also that the number of quantization indexes resulted from the linear quantization (lines 43-46) corresponds to the specific number.)

Kimura et al., Takakura et al. and Ishikawa et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takakura et al. and Ishikawa et al. with the teaching of Kimura et al. by determining the dynamic range of color values and then applying linear quantization with a fixed quantization step size to determine the number of quantization indexes (i.e., a specific number of representative colors). The motivation would have been to reduce the amount of data (by reducing the number of bits required to encode each value).

Therefore, it would have been obvious to combine Kimura et al. with Takakura et al. and Ishikawa et al. to obtain the invention as specified in Claim 5.

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15. Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1) and Ishikawa et al. (US 5,926,292) as applied to claims 1 and 16, further in view of Yada (US 6,285,458).

Regarding claim 6, and similarly claim21, Takakura et al. and Ishikawa et al. disclose everything except the following:

- extracting the number of colors included in the small region
- comparing the extracted number of colors and the specific number
- setting the extracted number of colors as the specific number when the extracted number of colors is less than the specific number

However, Yada teaches extracting the number of colors included in the small region and setting the extracted number of colors as the specific number when the extracted

number of colors is less than the specific number. [See Fig. 2, numerals 21, 22, 24, block labeled "Block Run-Length Mode;" Col. 8, lines 26-32. Col. 9, line 61 – Col. 10, line 16. Note that the specific number in this case is the smaller of thresholds th1 and th3 and that while not expressly set, the "new" specific number is obviously the number of colors in the region (since they are the colors that represent the colors of the region).]

Yada, Takakura et al. and Ishikawa et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takakura et al. and Ishikawa et al. with the teaching of Yada by extracting the number of colors included in the small region and setting the extracted number of colors as the specific number when the extracted number of colors is less than the specific number. The motivation would have been to be able to use a simple and effective lossless compression method, namely run-length encoding, to encode the region without losing any image quality.

Therefore, it would have been obvious to combine Yada with Takakura et al. and Ishikawa et al. to obtain the invention as specified in Claim 6.

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16. Claims 9-13, 24-28, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takaichi et al. (US 5,787,192), in view of Allebach et al. (US 5,544,284).

Regarding claim 9, and similarly claim24, Takaichi et al. discloses:

- preparing region color data, which is a pair of the color data of the representative colors and region information indicating sections of which the representative colors are extracted from colors [Col. 1, lines 49-51. Note that the bit maps correspond to the region information. Note also that the specific number of representative colors for each small region is two and the storing of the colors is inherent.]

Takaichi et al. does not expressly disclose

- increasing the number of representative colors sequentially

However, Allebach et al. teaches increasing the number of code values for luminance (considered as a color in any color representation that includes the luminance component), each identifying a portioned sub-region by repeated partition, (i.e., to increase the number sequentially), (See Col. 5, lines 9-19.)

Allebach et al. and Takaichi et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takaichi et al. with the teaching of Allebach et al. by increasing the number of representative colors sequentially through repeatedly partitioning if the desired

number of colors is achieved. The motivation would have been to fully utilize the capability of, say, the output device such as a display by using its entire color palette.

Therefore, it would have been obvious to combine Allebach et al. with Takaichi et al. and Ishikawa et al. to obtain the invention as specified in Claim 9.

17. Regarding claim 10, and similarly claim 25, Allebach et al. further teaches

- preparing a displayed image for a user from the region color data by selecting the number of the representative colors
  [Fig. 1, numerals 14-16; Col. 1, lines 29-43. Note that the number of colors (256 in this reference) is selected according to the display's capability]

18. Regarding claim 11, and similarly claim 26, Takaichi et al. further teaches

- transmitting the region color data by increasing the number of the representative colors sequentially
  [Fig. 1A, numeral 14. Note that increasing the number of the representative colors sequentially is taught as per the analysis of claim 9]

19. Regarding claim 12, and similarly claim 27, Takaichi et al. further teaches

- receiving the region color data by increasing the number of the representative colors sequentially
  [Fig. 1B, numeral 24. Note that increasing the number of the representative colors sequentially is disclosed as per the analysis of claim 9]
- displaying the color image for a user by increasing the number of the representative colors sequentially per the receiving
  [Fig. 1B, numeral 21; Col. 9, lines 11-16. Note that increasing the number of the representative colors sequentially is taught as per the analysis of claim 9]

20. Regarding claim 13, and similarly claim 28, Allebach et al. further teaches

- setting the number of colors required for displaying an image for a user

[Fig. 1, numerals 14-16; Col. 1, lines 29-43. Note that the number of colors (256 in this reference) is set according to the display's capability]

- extracting plural representative colors from the region color data according to the required number of colors
  [Col. 5, lines 9-19]
- deriving the color data of the displayed image according to the plural representative colors
  [Col. 5, lines 20-28]

21. Regarding claim 31, it is similarly analyzed and rejected as per the analyses for claims 1, 9, 11 and 12. Specifically,

(the transmitting device comprising:)

- Statistic calculating means for calculating statistics of the small region in color for respective color components
  [Per the analysis for claim 1 (and similarly claim 16)]
- Dividing means for selecting one color among the color components as a target component according to comparison between the statistics and dividing the small region into two sections according to a reference of the target color component
  [Per the analysis for claim 1 (and similarly claim 16)]
- Representative-color extracting means for extracting a respective color for each section of the section
  [Per the analysis for claim 1 (and similarly claim 16)]
- region-color-data preparing means for preparing a region color data combining color data of the representative colors and region information indicating sections of which the representative colors are extracted from colors
  [Per the analysis for claim 9 (and similarly claim 24)]
- transmitting means for transmitting the region color data
  [Per the analysis for claim 11(and similarly claim 26)]

(the receiving device comprising:)

- receiving means for receiving the region color data by increasing the number of the representative colors sequentially and displaying means for displaying the color image for a user by increasing the number of the representative colors sequentially at the time of the receiving
  [Per the analysis for claim 12(and similarly claim 27)]

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22. Claims 14 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1), in view of Ishikawa et al. (US 5,926,292) and Allebach et al. (US 5,544,284).

23. Regarding claim 14, and similarly claim 29, Takakura et al. discloses:

- switching a mode between a the color mode and a monochrome mode [Fig. 1, numerals 31, 33; Col. 8, lines 49-51]
- when the mode is switched to the monochrome mode, a specified color data is selected instead of the target component [Fig. 1, numerals 31, 33; Col. 8, lines 49-51. Note that the selected target color component is L*]
- the small region is divided into two sections according to a reference value of the selected color data instead of the target component [Fig. 1, numeral 35; Col. 6, lines 50-52. Note that while the specific bi-level conversion process is not expressly described, simple thresholding is a well-known binarization approach and the threshold corresponds to the specific reference value of the selected color data (L* in this case)]

Takakura et al. fails to disclose the following:

- approximating a small region on a color image with specific number of representative colors
- when the number of sections is less than the specific number, setting the sections as the small region

However, Ishikawa et al. and Allebach et al. teach allowing switching between modes and repeatedly partitioning until the desired number of colors (corresponding to the number of sections here, since each section has a representative color) is achieved. (See [Ishikawa et al.: Fig. 11, numeral 307; Fig. 13, numerals 332-334; Fig. 14; Col. 13, lines 36-42, 55-61; Col. 14, lines 7-32. Note that the specific number of representative colors is two, one per section] and [Allebach et al.: Col. 5, lines 9-12. Note that each cell in the reference corresponds to a region and that repeated partitioning is equivalent to

setting the sections as small regions (because then the "new" small regions can be further divided into sections)].)

Ishikawa et al., Allebach et al. and Takakura et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takakura et al. with the teaching of Ishikawa et al. and Allebach et al. by allowing switching between modes and repeatedly partitioning until the desired number of colors (corresponding to the number of sections here, since each section has a representative color) is achieved. The motivation would have been to be able to apply region-specific processing (since the characteristics of a, say, monochromic region and a color region will be very different) as well as to be able to fully utilize the capability of, say, the output device such as a display by using its entire color palette.

Therefore, it would have been obvious to combine Ishikawa et al. and Allebach et al. with Takakura et al. to obtain the invention as specified in Claim 14.

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24. Claim 15 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takakura et al. (PUB NO.: US 2001/0028737 A1), Ishikawa et al. (US 5,926,292) and

Allebach et al. (US 5,544,284) as applied to claim 14, further in view of Makita (US 6,269,186).

25. Regarding claim 15, and similarly claim 30, Takakura et al., Ishikawa et al. and Allebach et al. disclose everything except the following:

- the reference value is an average

However, Makita teaches using the average color value as the threshold (i.e., the reference). (See Abstract; Fig. 1, numeral 104; and Fig. 2, numeral S202.)

Makita, Takakura et al., Ishikawa et al. and Allebach et al. are combinable because they have aspects that are from the same field of endeavor of compression.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine Takakura et al., Ishikawa et al. and Allebach et al. with the teaching of Makita by using the average color value as the threshold (i.e., the reference). The motivation would have been that the average is the byproduct of computing the variance and therefore requires no additional computing time.

Therefore, it would have been obvious to combine Makita with Takakura et al., Ishikawa et al. and Allebach et al. to obtain the invention as specified in claim 15.

Conclusion

26. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

27. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
October 4, 2004

BHAVESH M. MEHTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600